Getting to Zero Energy Challenge:
Claim your Energy Independence

I. Background

The recent and well-publicized increase in energy costs, particularly energy sourced from fossil fuels, is becoming a significant cost burden to homeowners in order to operate and maintain their household. The problem is particularly acute in New England where many homeowners depend on oil or natural gas to heat their homes and/or water during the cold winter months. Notions of housing affordability need to expand beyond the structure and land costs of the dwelling to include the very real cost of operating them in order to provide a healthy environment. This is a very real challenge facing homeowners and residents of Lowell in the immediate future.

The cost of natural gas has significantly increased to $20.19 (July 2008) per 1000 cubic feet, up from $14.86 in July 2005, a 26% increase[1]. Electricity prices have also skyrocketed in recent years, according to National Grid's service cost chart the basic service charge (does not include delivery charge) was 11.790 cents per kWh, up from 7.213 cent per kWh during the same period in 2005; a 39% increase. Oil has certainly garnered the most press as gas and home heating oil prices surged in the summer months, although there has been a recent decline in crude oil price home heating oil remains expensive compared to historic standards. In October 2008 the cost of home heating oil in Massachusetts averaged $3.09 per gallon, in 2005 the average cost was $2.51 per gallon; a 19% increase[2].

The costs of energy production via fossil fuels discussed thus far doesn't take into account the costs incurred by society due to the emission of green house gasses and other air borne pollutants. These costs, though not directly born by the user, are becoming more and more evident on a global scale as the affects of global warming begin to show and as air pollution is consistently linked to many health hazards. Global Warming is a reality; although we may not know the extent to which human behavior has caused or exacerbated it, we know that the release of green house gasses due to human behavior is a significant contributor. Estimates show that the building and development industry accounts for 40% of all greenhouse gas emissions. Although the problem is at a global scale the solution requires a decentralized, local, personal effort.

New technologies and ancient practices can be utilized to reduce the operational costs of providing energy of a home by generating energy on site and making efficient use of energy provided, adds equity to the structure, and reduce pollutants emitted from burning fossil fuels used to generate energy. The options to choose from are plentiful from solar orientation, solar power/heating, geothermal exchange, insulation, and improved construction practices. The challenge is the general lack of understanding by the homeowner as well as the design and construction industry. There is also the belief that these technologies and practices are too expensive, an option for only the rich.

II. Objective

The competition seeks to promote a greater understanding of the technologies and building practices available to Lowell residents who must operate within the City's unique context in order to reduce their energy needs either through on-site energy generation or conservation. The competitions long-term goal is to make viable alternative options to homeowners in order to reduce the cost burden of energy needed to operate their homes and reduce environmental impacts.

By employing a competition format, applicants will be able to assemble and utilize technologies and conservation techniques that prove the most viable within the context of Lowell rather than those technologies that receive the most press. Through this process residents will have access to information that definitively illustrates the opportunities and challenges of employing green building concepts related to energy efficiency and on-site generation.

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[1] U.S. Energy Information Administration "Natural gas Navigator", report released September 30, 2008.
[2] U.S. Energy Information Administration "Petroleum Navigator", report released October 22, 2008.

It is expected that at the very least the winning design will serve as a model for Lowell residents in taking steps to energy independence. Results of the competition include the development of a clearinghouse of information available to homeowners, contractors, and developers interested in 'green' technology and resources to make it more affordable.

This resource will be included on the City's web site, in paper form for those without access to the Internet, and will be made available in public venues such as City Hall, the Library, and through neighborhood groups. The program resource will include local case studies that will demonstrate best practices for residents in Lowell; this is significant as "green" technologies provide a broad set of tools that work better in some regions than others. Data and knowledge based on projects completed in Lowell will prove more useful to residents while exploring the cost and benefits of approaching "green" building enhancements to their home.

It is our hope that the energy competition will provide the platform to elevate the concept "green" building as a viable option to the average homeowner, and that housing affordability include operational costs as well as the capital costs associated with land and structure. While the City has been at the forefront in producing and maintaining housing options to middle and low-income families, this program represents an opportunity for the City to take the forefront in providing energy affordability to its residents.

III. Award*

A **$25,000 GRANT** will be awarded to the applicant that develops a project proposal that achieves energy production closest to net zero energy for their residential structure through efficiency gains and utilization of on-site renewable energy sources. Net Zero Energy can be generally defined as a residential building that produces as much energy as it uses over a year's period of time. The "getting to zero" competition does not require the winner to achieve net zero energy, but the competitor that gets closest wins.

At a minimum the winner must achieve 50% of the energy used by the average home based on the Department of Energy's 2006 International Energy Conservation Code, and must improve on the existing conditions of the building by 35%. As a reference, Energy Star Homes are at least 15% more efficient than the average home.

Two residential structures will be awarded the $25,000 prize, one that is restricted for residents that earn below 80% of the area median income (See Form C attached for income requirements). The second building will not be income restricted and will be open to residents of all income levels within the City of Lowell. Grants must be utilized to fund energy efficiency projects, household appliances[3], or implementation of on-site renewable energy sources.

Please see our web page for a complete list of resources to help you get started in developing a plan to win $25,000 at the following link: www.gettingtozero.lowellma.gov

IV. Eligibility

Any residential building located within Lowell City limits, contains between 1 to 4 units, and is under four stories tall will be eligible for the competition. Residential buildings may be owner occupied or rented. New construction will not be eligible, only building rehabilitation will be accepted and is open to any combination of owner occupied, rented, or a redevelopment project for sale or lease by for-profit and non-profit developers[4].

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[3] Funding can only be applied to essential appliances that are EnergyStar rated (i.e. water heaters, refrigerators, etc.)

[4] For projects that are developed as rental units for low to moderate-income residents, rents must meet Fair Market Rents as defined by the Department of Housing and Urban Development. For Redevelopment projects that will be sold to low to moderate income families, the monthly housing payment, including mortgage principal and interest, private mortgage insurance, property taxes, condominium and/or homeowner's association fees, insurance, and parking, shall not exceed 30 percent of the maximum monthly income permissible.

Income restricted projects must be reserved for households that are at or below 80% of the area median income (see attached income declaration report for greater detail, Form C). The following restrictions apply to multifamily houses that are competing for the income-restricted award:

- For multifamily units, 51% of the units must be occupied by households who meet the income requirement.
- Two-family residential buildings must have at least one unit occupied by households who meet the income requirement.
- Affordability restrictions may be applied to "for sale" or rental units, any deed restriction must meet statutory requirements in G.L. Chapter 184, Section 31. Units that are to be sold or rented to income eligible residents must submit a deed restriction maintaining affordability for at least 30 years.

V. Competition Timeline

There are effectively three phases of the competition. Phase 1 includes the competition opening and will consist primarily of research, plan development, and selection of the competition winner. Phase 2 will be the construction phase once competition winners have been awarded, and Phase 3 will include plan and construction testing to determine real energy use, case study development, and an open house to provide access for interested people to see strategies that were used to achieve deep energy reduction.

During **Phase 1** applicants will have six months to assess current energy use, research technologies and available incentives, and develop a plan proposal that will get them as near to net zero energy as possible. During this phase there will be two submissions, first a Notice of Intent to apply that includes basic information of the project plan, and the final submission that will culminate in the selection of two winners in each category who demonstrate the lowest energy needs based on the HERS rating[5]. The **Notice of Intent submission deadline is February 20, 2009**; the final **Application and Submission deadline is March 15, 2009**.

Phase 2 consists of construction and implementation of the proposed plan for the competition winners. During this phase the applicants may be required to provide access to their building for case study and development review. Once the competition winners have been identified they will have four months to complete construction and rehabilitation. Applicants are encouraged and advised to start construction before April 1, 2009 on any aspect of their proposal that they expect to carry out regardless of wining the award money.

Phase 3 is the final phase and will consist largely of data and information development including post construction assessment of energy efficiency gains, analysis of costs and payback period, case study development, and a minimum of one open house to demonstrate technologies and strategies used to achieve energy efficiency. Data analysis and case study development will be the responsibility of the City of Lowell and its consultants Advanced Building Analysis. Distribution of funds will be made to the competition winners upon completion of proposed energy efficiency and renewable energy enhancements.

VI. Application Process

Following is a general outline of the application process. Other than the submission of the Notice of Intent and completed Plan Submission and Application, these steps outlined below are not required but are encouraged.

STEP 1: All interested competitors should first read through this application form completely and browse our web page for any additional information; www.gettingtozero.lowellma.gov

[5] Home Energy Rating System (HERS) developed by Residential Energy Services Network (RESNET). http://www.natresnet.org/

STEP 2: Applicants are encouraged to apply for a free Home Energy Assessment through MassSave. An assessment includes an inspection of the entire building by an energy expert who will provide you with energy efficiency improvements that can be made and a list of available incentives from National Grid.

STEP 3: Submit an "Intent to Apply" to the Lowell Division of Planning and Development by **January 1, 2009**. At this point you should have a solid understanding of the existing building's construction and energy sources, a conceptual plan for improvements, and a list of potential funding resources. Please see below for a complete list of submission requirements, under Section 7A.

STEP 4: Applicant's shall submit a complete final Submission and Application including all forms and attachments as described below in section 7B to Lowell, Division of Planning and Development. The final submissions must be delivered to the Division of Planning and Development by noon **March 15, 2009**.

STEP 5: The selection committee will have six weeks to review plans to determine which of the proposals demonstrate the deepest energy reductions, show the greatest reduction in energy use, and articulate resources that will be used to implement the plan proposal. The committee may choose up to three finalists that may be eligible for additional funding to refine plans to an "as-built" detail.

STEP 6: Advanced Building Analysis, a 3rd party consultant to the City of Lowell, will develop a model for the finalists chosen by the selection committee, based on the plans that where submitted. The model that shows the lowest HERS rating will then be selected as the "Getting to Zero Challenge".

VII. Selection Criteria

There will be phased approach to the selecting the competition winners. The first phase will include a selection of up to three finalists by the Competition Jury based on criteria described below. The second phase will include a HERS model of each of the finalists plan developed by Advanced Building Analysis.

The Competition Jury comprised of representatives from the City of Lowell Division of Planning and Development, Umass Lowell Engineering Department, Member of the Lowell Green Building Commission, and a representative from Nexus/Green Round Table.

Competitors are required to submit their final plan complete with all forms and attachments as listed below in section 7B prior to the April 1, 2009 deadline. At this point the selection committee will select three plan submissions that best demonstrate the ability to provide deep energy reductions, show the greatest reduction in energy use, and articulate resources that will be used to reach their goal.

Advanced Building Analysis, the City's 3rd party consultant will then develop a model of each of the selected competitors plans to determine who will provide the lowest HERS rating, therefore provide the most energy efficient residential structure. The competitor with the lowest HERS rating, with a minimum index rating of 50, and demonstrating a minimum reduction of 35%, will be awarded the "Getting to Zero" prize of $25,000.

VIII. Submission Requirements

A. Intent to Apply (Submission Materials due Jan. 1, 2009)

____ Intent to Apply Form (attached Form A)

____ Self Declaration of Income Report – only for income restricted projects (attached Form C)

____ Narrative describing the building type, number of units, whether units will be owner occupied or rented, if the project will contain income restricted units and if so how they will be structured and the conceptual plan for rehabilitation.

____ Assessment of the building's existing conditions and proposed efficiency improvements based on the REScheck protocol (http://www.energycodes.gov/rescheck/)

B. Final Application and Submission (Submission Materials due March 15, 2009)

____ Final Application and Submission Form (See Attached Form B).

____ Release forms allowing landlords to conduct work in tenant spaces (For projects incorporated non-owner occupied units only).

____ Release forms from condo association or homeowners association allowing condo unit or co-op unit owners to conduct work in common areas.

____ Description of funding sources for plan implementation, including other available incentives, construction loans, personal equity, etc.

____ Plan drawings including the following; site plan, floor plan, and foundation; building elevation of each side, and building section with wall assembly details.

____ Detailed specifications and/or manufacturer's cut sheets for proposed equipment or construction materials proposed.

____ A copy of the current deed to the property undergoing rehabilitation.

____ Assessment of the building's existing conditions based on REScheck protocol. (http://www.energycodes.gov/rescheck/).

____ Narrative describing the building type, number of units, whether units will be owner occupied or rented, if the project will contain income restricted units and if so how they will be structured and detail plan for rehabilitation. The plan description shall include construction phasing, materials and equipment proposed, and contractors conducting work.

VII. Authorization (Must be Signed by the Owner of the Property)

I am the record owner of the property for which this application is being filed and as such, I am familiar with the work that is proposed for my property.

I certify that all information provided in this application and any supporting material is accurate to the best of my knowledge.

I further certify that under the penalties of perjury, I am authorized to sign this application.

Name (Please Print): _____

Title: _____

Signature: _____

Date: _____

If representing a group, corporation, or other organization please attach a copy of the vote authorizing you to act on behalf of such organization for the purposes of this application.

Submit all required materials to:

Aaron Clausen, Associate Planner; aclausen@lowellma.gov or
Sandy Swaile, Design Planner; swaile@lowellma.gov
Division of Planning and Development,
JFK Civic Center, 50 Arcand Drive, Lowell, MA 01852
(978) 446-7200, fax: (978) 446-7014
www.lowellma.gov

*In the event the City of Lowell, Division of Planning and Development determines that no applicants have met performance or eligibility requirements as described above, as lead sponsor of the “Getting to Zero Energy Challenge” Lowell DPD with assistance with its co-sponsors, reserves the right to modify the competition, start a new competition, or utilize competition funding for another energy efficiency or renewable energy project.

Getting to Zero APPLICATION

(FORM A)

INTENT TO APPLY Deadline: Jan 1, 2009

NAME		
ADDRESS		
# of Units in Building or Condo Association Application		
# of floors		
Which competition are you entering?	Low to Moderate Income	No Limit on Income
EXISTING SYSTEMS		
Existing Heating System	Air or Hot water	Gas or oil
Existing hot water	Electric stand alone	on gas or oil burner
Air Conditioning	Individual	Central
ANTICIPATED IMPROVEMENTS	Where	Type
Insulation		
Windows/ doors		
Gas Boiler replacement		
Furnace replacement		
Geothermal heat pump		
Cold Air Heat Pump		
Supplemental Heating		
Hot Water Replacement		
Air Conditioning		
PV Installation		
Other		
DO YOU NEED HELP?		
What improvements to do?		
Getting a contractor/installer?		
Financing ?		
Filling out the forms?		

Getting to Zero APPLICATION

(FORM B)

APPLICATION & SUBMISSION Deadline: April 1 , 2009

NAME of APPLICANT/APPLICANTS			
ADDRESS			
ASSESSING RECORDS	Assesed Value Building Assessed Value Land	Yearly Taxes Taxes due	
REGISTRY RECORDS	Deed # Owners	Description Easements	
MORTGAGES, MORTGAGEES	Provider	Type & Amount	
INSURANCE PROVIDER	Name of Provider Policy Type?	Recent Claims	
ZONING DISTRICT			
BUILDING DEPARTMENT	Permit to build Recent code violations	Lead, asbestos, or radon issues	
RENTAL UNITS, TENANTS			
ACCESS RELEASE from TENANTS (attach to application)	Energy Audit Construction	Open Houses	
RELEASE from CONDO ASSOCIATION (attach to application)	Construction	Audits/open houses	
FINANCING SOURCES	Loans	Savings	Other Grants

INCOME LEVELS (For Income Limited Competition Only)

FAMILY YEARLY INCOME of OWNER				
FAMILY YEARLY INCOME of TENANTS				
FAIR MARKET RENTS				

Getting to Zero APPLICATION

(FORM B)

APPLICATION & SUBMISSION — Deadline: April 1 , 2009

HOUSE DESCRIPTION	Style, Age, Material, Condition of roof ? Number & condition of chimneys, Dampness, Mildue, Mold issues		History of renovations Recent Energy Audits
SITE	Access, Curb cuts, Clearance @ sides, Orientation, Sun, Shadows,Vegetation		Flooding events? Flood zone?
PLANS	Show floor, Foundation, Site		Attach to Application
ELEVATIONS	Grade level @ all sides		
SECTION	Ceiling & floor levels, Wall asembly		
INSULATION	**Material**	**Thickness , Framing Depth**	**Type**
WALL			
CEILINGS			
FLOORS			
BASEMENT			
DOORS	Material	# & Size	Type
WINDOWS	Material	# & Size (rough opening)	Type
ELECTRICAL	Current Bill ?		
APPLIANCES	Kitchen (type, fuel, efficiency)	Laundry (type, fuel, efficiency)	Other (type, fuel, efficiency)
LIGHTING	Attached	Plug In	Exterior
	Total # # Florescent	Total # # Florescent or LED	Total # # Solar

HEATING	**FUEL / Current yearly bill?**	**DISTRIBUTION/ Zones?**	**SIZE/OUTPUT**	**AGE/ REPAIR HISTORY**
	Oil, gas, propane, electric, other?	Hot water, steam, hot air? Open,closed loop? Radiant floor?		
SECONDARY HEATING	**FUEL/ current yearly bill?**	**Vented**	**Size & Make**	**Condition**
	Wood Gas Electric	Emissions Rating?		Chimney condition?
HOT WATER	**FUEL**	**TYPE**	**CAPACITY Size tank**	**AGE/ Repair**
	Electric, gas, oil,	On demand, stand alone, On furnace, other?		
COOLING	**Electric, heat pump**	**Central, individual**	**BTU, Tons**	**Make, Model**
VENTILATION	Exhaust only, vents?	Fans?	Attic?	

Getting to Zero APPLICATION

(FORM B)

APPLICATION & SUBMISSION — Deadline: April 1 , 2009

INSULATION	Framing space/depth Insulation thickness	R Value	Type (Cavity/continuous) Hi/low density foam
Exterior Walls, Rim,joist bands			
Top ceilings, attic, roof, cathedral ceiling			
Floors over unconditioned space			
Foundations wall, basement floor			
Air Seal & Leaks			

WINDOWS & DOORS	Material, Type	Manufacturer	Make	Series
WINDOW Upgrade,	Low E, Argon filled ? # Panes, clear? vinyl/wood frame, other	NFRC whole unit U-value & SHGC		
Exterior DOOR Upgrade	Insulated steel, fiberglass, wood, storms ?			

LIGHTING	Fixed	Plug In	Exterior
	% Compact or Pin-based Fluorescent	%Florescent or LEDs	Solar, tube light?

APPLIANCES	Kitchen (Type, fuel, size, EnergyStar)?	Laundry (Type, Energy Rating?)	Other (Type, EF, Energy Star) ?

CONTROLS	Thermostats	Sensors	Timers

ELECTRICAL SUPPLY						
PV Installation	Array area, Type, Peak watts	Model, Make	Tilt, direction,	Inverter efficiency	Installer	
Cogeneration Unit	Size, type, kW generated.		Type fuel?	Hot water, AC?	AFUE or COP rating	Model, Make?

Getting to Zero APPLICATION

(FORM B)

APPLICATION & SUBMISSION Deadline: April 1 , 2009

HEATING EQUIPMENT	FUEL	DISTRIBUTION	BTU CAPACITY /AFUEor-COP rating	MAKE	MODEL
	Oil, gas, biofuel?	Warm air, Hot water, Radiant Floor? Hydro Air?			
	Geothermal, Cold Climate Heat Pump	Open or closed loop ?			
SUPPLEMENTAL HEAT					
	Electric Gas Fireplace	Vented			
	Wood	Emissions (must meet -2 grams/hr.)			
Passive Features	Sun Porch	Thermal Storage	Other		
COOLING EQUIPMENT	**TYPE**	**DISTRIBUTION / CENTRAL**	**BTU CAPACITY SEER or COOP**	**MAKE**	**MODEL**
	Air to Air ? Geothermal ? Absorpton?	Mini Ducts? Hydro Air? Other?			
Passive features	Ventilation	Shading	Other		
DOMESTIC HOT WATER	**FUEL**	**TYPE**	**BTU Capacity Energy Factor (EF)**	**MAKE**	**MODEL**
	Gas, Oil, Electric, Geothermal, Solar, Waste heat recovery?	Stand alone, Indirect fired, Instant, Tankless Coil, Desuperheater, Dedicated			
SOLAR THERMAL	Type	Area, Tilt?	Storage Capacity	Make	Model
Hot Water Heat					
VENTILATION		**TYPE**		**MAKE**	**MODEL**
	Exhaust Only?	Heat Recovery Ventilator?			

NOTE: Please attach all supporting material, or any features that require additional space.
Keep your name on all of the additional pages.

Also attach any and all audits that you have had performed, including RES Check, Mass Save, etc.

APPENDIX C

(Updated 2/08)

SELF-DECLARATION OF INCOME REPORT / FY2008-09

Federal regulations require we obtain this information to document assistance is being provided to low and moderate-income households. The Participant/Guardian should complete this form indicating all persons residing within their household, regardless of whether or not they are related. The Grantee should retain this form for monthly reporting requirements as well as for on-site monitoring visits.

INFORMATION PROVIDED ON THIS FORM IS KEPT CONFIDENTIAL AND IS NOT SHARED WITH ANY OTHER AGENCIES

PARTICIPANT INFORMATION

PARTICIPANT STATUS: ☐ FAMILY ☐ INDIVIDUAL

Participant Name: _____

Address: _____ City, State, Zip Code: _____

ETHNICITY *(please select only one):*

☐ Hispanic or Latino ☐ Not Hispanic or Latino

RACE *(please select only one):*

☐ White
☐ Black/African American
☐ Asian
☐ American Indian/Alaska Native
☐ Native Hawaiian/Other Pacific Islander
☐ American Indian/Alaskan Native ***and*** White
☐ Asian ***and*** White
☐ Black/African American ***and*** White
☐ American Indian/Alaskan Native ***and*** Black/African American
☐ Other Multi-Racial: _____

HOUSEHOLD INFORMATION

1) Circle the number of family and non-family members living in your household below.

2) Circle the corresponding income level. (FY2008 Median Family Income)

Household Size	#1 (0% - 30%)	#2 (31% - 50%)	#3 (51% - 80%)	#4 (81% and above)
1 →	$0-$17,800	$17,801-$29,700	$29,701-$43,050	$43,051+
2 →	$0-$20,350	$20,351-$33,900	$33,901-$49,200	$49,201+
3 →	$0-$22,900	$22,901-$38,150	$38,151-$55,350	$55,351+
4 →	$0-$25,450	$25,451-$42,400	$42,401-$61,500	$61,501+
5 →	$0-$27,500	$27,501-$45,800	$45,800-$66,400	$66,400+
6 →	$0-$29,500	$29,501-$49,200	$49,201-$71,350	$71,351+
7 →	$0-$31,550	$31,551-$52,600	$52,601-$76,250	$76,251+
8 →	$0-$36,600	$36,601-$55,950	$55,950-$81,200	$81,201+

I certify the above information is true and correct to the best of my knowledge.

Participant/Guardian: _____ **Date:** _____

(Original signature is required)